REMARKS

Claims 1, 3 and 6-12 are pending in the application, with Claims 1 and 12 being independent. Claims 10 and 11 have been withdrawn from consideration. Claims 2, 4 and 5 have been cancelled herein without prejudice to or disclaimer of the subject matter contained therein. Claims 1, 3 and 9-11 are amended to more clearly recite the features of the present invention. Claim 12 is newly added. Support for the amendments and Claim 12 may be found in the specification at least at page 12, line 13 to page 13, line 4. It is respectfully submitted that no new matter has been added.

Claims 1-3 and 6-9 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as allegedly obvious over, Tomizawa et al. (U.S. Patent No. 5,985,425). Claims 1-4, 6, 7 and 9 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as allegedly obvious over, Sakaki et al. (U.S. Patent No. 4,783,376). Claims 1-4, 6, 7 and 9 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Ito et al. (U.S. Patent No. 5,912,085). Claims 1-9 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Ito et al. Applicant respectfully disagrees with these rejections.

Before addressing the merits of the rejections, Applicants believe it will be helpful to review some features and advantages of the present invention. As recited in independent

Claims 1 and 12, the invention relates to an ink-jet recording medium, comprising, inter alia, an ink-receiving layer containing polyvinyl alcohol and an epoxy compound as a cross-linking agent, wherein the content of the polyvinyl alcohol in the ink-receiving layer is not lower than 30 weight %, and the content of the epoxy compound is such that 1 to 10 equivalents of epoxy ring is contained based on 100 equivalents of OH group of the polyvinyl alcohol.

As discussed in the specification, the ink-jet recording medium of the present invention provides a significant improvement over ink-jet recording medium of the prior art. For example, the ink-jet recording medium of the present invention provides technical advantages, such as high quality images and faster printing.

Tomizawa et al. relates to an ink-jet recording film comprising an ink-receptive layer that contains a water-soluble resin, and an overcoating layer for dot-profile control. Tomizawa et al. provides that a crosslinking agent may be used with the water-soluble resin. However, Tomizawa et al. does not teach or suggest the use of any crosslinking agent other than urea when the water-soluble resin is a polyvinyl alcohol (column 4, lines 36-42). As urea is not an epoxy compound, the reference does not teach or suggest the claimed invention.

Sakaki et al. relates to a light-transmissive recording medium comprises a coating layer having specified electric resistance. Sakaki et al. provides that the recording medium may

contain a compound in which the coating layer has crosslinking properties and a cationic modified product of polyvinyl alcohol. However, Sakaki et al. does not teach or suggest the use of an epoxy compound as a crosslinking agent for polyvinyl alcohol.

Ito et al. relates to a recording material comprising a substrate layer and an ink receiving layer formed on the substrate layer. Ito et al. provides that the ink receiving layer may contain an ink absorptive resin, a curing agent and a surfactant, and that epoxy resins may be used as the curing agent. However, Ito et al. discloses that the curing agent is contained in a proportion from 0.1 wt % to 20 wt % relative to the amount of the ink absorptive resin. Ito et al. does not teach or suggest an ink-receiving layer in which the content of the epoxy compound is such that 1 to 10 equivalents of epoxy ring is contained based on 100 equivalents of OH group of the polyvinyl alcohol.

Applicant submits that none of the references discussed above teaches or suggests teaches or suggests the aforementioned features of the present invention, namely, an ink-receiving layer containing polyvinyl alcohol and an epoxy compound as a cross-linking agent, wherein the content of the polyvinyl alcohol in the ink-receiving layer is not lower than 30 weight %, and the content of the epoxy compound is such that 1 to 10 equivalents of epoxy ring is contained based on 100 equivalents of OH group of the polyvinyl alcohol.

Accordingly, Applicant concludes that none of the references anticipates or renders obvious the present invention as recited in independent Claims 1 and 12.

Applicant submits that the present invention is patentably defined by independent Claims 1 and 12. The dependent claims are allowable for the reasons given regarding independent Claims 1 and 12, as well as for the patentable features recited therein. Individual consideration of the dependent claims is respectfully solicited.

Applicant submits that this application is in condition for allowance. Since Claims 11 and 12 are depend upon Claim 1, Applicant respectfully requests rejoinder of Claims 11 and 12 and issuance of a Notice of Allowance.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO THE SPECIFICATION

The paragraph starting at page 1, line 12 and ending at line 23, has been amended as follows:

--Various types of recording medium to be used for forming images by ink-jet printing are known to date. Besides, recording devices (printers) using an ink-jet printing technique have developed a wide variety of applications including electronic image information outputs of computers and communication networks and those of digital cameras, digital videos and scanners, which [by] in turn urge the development of functionally improved recording devices. As a result, [the] there is a demand for ink-jet recording medium [is facing a demand for] having various sophisticated functional features that can accommodate the functional improvements of the recording device.--.

The paragraph starting at page 2, line 17 and ending at page 3, line 2, has been amended as follows:

--When the binder of the ink-receiving layer contains polyvinyl alcohol as a principle ingredient and the lamination process is conducted immediately after an ink-jet printing

operation, [there can appear] a swell <u>can appear</u> between the substrate of the ink-jet recording medium and the ink-receiving layer formed thereon while the substrate is heated. Additionally, when the heat resistant substrate is peeled off after the transfer of the transparent film layer, the ink-receiving layer can also be peeled off together with the heat resistant substrate. Therefore, there is a demand for a lamination process that is free from the above identified problems.--.

The paragraph starting at page 3, line 5 and ending at line 18, has been amended as follows:

--In view of the above described circumstances, it is therefore an object of the present invention to provide an ink-jet recording medium suitable for easy and excellent laminate formation and free from the problem<u>s</u> [that] <u>such as</u> swell [can arise] <u>arising between the ink-receiving layer and the substrate of the ink-jet recording medium</u> immediately after an ink-jet printing operation<u>,</u> and [particularly that an] <u>peeling off of the</u> ink-receiving layer [is also peeled off] at the time of peeling off a heat resistant substrate after the transfer of a transparent film layer. More specifically, an object of the

present invention is to provide an ink-jet recording medium having a novel ink-receiving layer to which a transparent film layer is transferred in the lamination process without any problem.--.

The paragraph starting at page 3, line 19 and ending at page 4, line 13, has been amended as follows:

--As a result of the intensive research efforts for solving the above identified problems, the inventors of the present invention [came to find] found that the tight contact between the ink-receiving layer and the substrate of the ink-jet recording medium is maintained and swells between them are prevented, when polyvinyl alcohol is used as a principal ingredient of a binder for fixing inorganic particles that are used to improve ink absorptivity, and the polyvinyl alcohol molecules are cross-linked by the heat-induced action of a cross-linking agent contained therein during the process of transferring the transparent film layer onto the ink-receiving layer after the ink-jet printing operation. The inventors of the present invention also found that both the phenomenon of swell arising between the substrate of the ink-jet recording medium and the ink-receiving layer and that of peeled-off of the ink-receiving layer arising in the operation of peeling off the heat

resistant substrate that carries the transparent film layer on the surface thereof are eliminated by the use of such a binder [, which leads to the present invention].--.

The paragraph starting at page 7, line 21 and ending at page 8, line 6, has been amended as follows:

--The ink-receiving layer contains a binder whose principle ingredient is polyvinyl alcohol. Polyvinyl alcohol can suitably be used as the binder of the ink-receiving layer from the viewpoint of ink absorptivity and economy because it can be purchased at low cost. Polyvinyl alcohol can be obtained by saponifying the ester thereof that has been synthetically produced. For the purpose of the invention, polyvinyl alcohol having a saponification degree of 78% to 89% can most suitably be used for the ink-receiving layer. The binder of the ink-receiving layer may contain urethane or the like. Preferably, the ink-receiving layer contains not less than 30 [mass] <u>weight</u> % of polyvinyl alcohol.--.

The paragraph starting at page 10, line 5 and ending at line 21, has been amended as follows:

--Various additives such as dispersants, fluorescent dyes, pH adjusters, lubricants and surfactants that can be added to the ink-receiving layer of conventional recording mediums may also be appropriately and selectively added to the ink-receiving layer of an ink-jet recording medium according to the invention whenever necessary. In view of the fact that the ink-receiving layer of an ink-jet recording medium according to the invention contains porous inorganic particles and various additives, the polyvinyl alcohol content of the ink-receiving layer is preferably not higher than 70 [mass] weight %, more preferably not higher than 50 [mass] weight %. In other words, the content of inorganic porous particles and that of various additives need to be so selected that the polyvinyl alcohol content of the ink-receiving layer is found to be between 30 and 70 [mass] weight %, preferably between 35 and 50 [mass] weight %.--.

The paragraph starting at page 11, line 6 and ending at line 21, has been amended as follows:

--According to the invention, a cross-linking agent is added to the ink-receiving layer in order to cross-link polymer molecules of polyvinyl alcohol that are used as a binder after an ink-jet printing operation. Preferably, a compound that reacts

with hydroxy groups of polyvinyl alcohol in a heated condition to cross-link polymer molecules of polyvinyl alcohol is [preferably be] used as [a] the cross-link agent [for the purpose of the invention]. Preferable compounds [that can suitably be used] as [a] cross-linking agents for the purpose of the invention include isocyanate compounds and epoxy compounds. By using such cross-linking agent, polymer molecules of polyvinyl alcohol are cross-linked to prevent any swell between the ink-receiving layer and the substrate during the process of laminating a transparent film while applying heat.--.

The paragraph starting at page 13, line 5 and ending at line 15, has been amended as follows:

--[The] A disperse liquid [to be] used for forming the ink-receiving layer [that] is prepared by adding a cross-linking agent to [a predetermined proportion with respect to] polyvinyl alcohol in a predetermined proportion along with porous inorganic particles such as silica particles and other additives, and mixing them to produce a uniform mixture. The disperse liquid is then applied onto the substrate to form the ink-receiving layer. Techniques that can be used for applying the disperse liquid to

the substrate include roll coating, rod bar coating, slot die coating or the like.--.

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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Twice Amended) An ink-jet recording medium, comprising a base sheet and an ink-receiving layer on the base sheet, for use in an ink-jet image forming method in which a transparent film layer formed on a substrate as coating is placed on the ink-receiving layer on which recording has been conducted, and then the side of said substrate is heated to transfer said transparent film layer on said ink-receiving layer, followed by peeling off said substrate to laminate said transparent film layer on the surface of said ink receiving layer, said ink-receiving layer containing polyvinyl alcohol and an epoxy compound as a cross-linking agent, wherein the content of the polyvinyl alcohol in said ink-receiving layer is not lower than 30 weight %, and the content of the epoxy compound is such that 1 to 10 equivalents of epoxy ring is contained based on 100 equivalents of OH group of the polyvinyl alcohol.

3. (Amended) The ink-jet recording medium according to claim 1 [or 2], wherein the degree of saponification of said polyvinyl alcohol is between 78% and 89%.

9. (Amended) The ink-jet recording medium according to claim 1 [2], wherein the average degree of polymerization of said polyvinyl alcohol is between 1,500 and 3,600.

10. (Amended) The ink-jet printed article comprising the ink-jet recording medium according to claim 1 [or 2] having an image formed on the ink-receiving layer thereof, said transparent film layer being formed on said ink-receiving layer as coating.

11. (Amended) An image forming method comprising the steps of forming an image on the ink-receiving layer of the ink-jet recording medium according to claim 1 [or 2] by ink-jet and coating said ink-receiving layer with the transparent film layer by heating.